



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of

Joseph Scott DiGANGI et al.

Atty. Ref.: 4345-35

Appl. No. 10/678,305

TC/A.U. 3616

Filed: October 6, 2003

Examiner: T.C. To

For: PRESSURE WAVE GAS GENERATOR

\* \* \* \* \*

April 13, 2006

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**DECLARATION OF INVENTOR, JAMES MICHAEL ROSE**

The undersigned hereby declares as follows:

1. He is one of the joint inventors of the subject matter of the above-identified patent application;
2. He has a Masters Degree in Mechanical Engineering;
3. He is a licensed Professional Engineer in the State of Virginia;
4. He has been employed as an engineer in the aerospace field and related fields by various companies for over 25 years;
5. He has worked as an engineer specializing in gas generators and inflators for automotive airbags and other safety restraints for over 14 years and is currently employed by ARC Automotive, Inc. in Knoxville, Tennessee in this capacity;

6. He has read the specification and current claims in the above-identified patent application, specifically with respect to the recitation that the second predetermined pressure is sufficient to create a pressure wave that travels through the pressure vessel at sonic velocity,

7. The recitation of the pressure wave traveling at sonic velocity is supported by the disclosure in pages 5 and 6 of the specification, as well as in Figs. 3 and 4 of the drawings of the above-identified application,

8. A person skilled in this particular art would readily understand from the equations or formulas in "Elements of Gasdynamics" and in "The Dynamics and Thermodynamics of Compressible Fluid Flow, Vol. 2" set forth on pages 5 and 6 of the specification and the schematic views in Figs. 3 and 4 of the drawings that the pressure wave travels through the pressure vessel at sonic velocity. The equations or formulas on pages 5 and 6 of the specification use sonic wave velocities (waves propagating at the speed of sound) in the development thereof, and "C" in Figs. 3 and 4 of the drawings is the velocity of sound and is the definition of sonic velocity.

9. There is no disclosure in the patent to Rink et al. No. 5,964,479 of the creation of a pressure wave that travels through the pressure vessel at sonic velocity to create a localized pressure at the manifold rupture disk to rupture it and allow flow of gas through the manifold before the gas in the pressure vessel is significantly heated and pressurized by the gas flow from the initiator housing.

10. In Rink et al., the passage of the reaction products into the gas storage chamber 312 serves to increase both the temperature and a relative amount of gaseous products within the

gas storage chamber. When the gas pressure within the gas storage chamber 312 exceeds the structural capability of burst disk 3344, the disk ruptures and permits the passage of the heated and expanded stored gas as well as reaction products or other material passed into the gas storage chamber 312 from the reaction chamber 313 into the associated airbag. The acetylene-based airbag inflator of Rink et al. does not create a pressure wave that creates a localized pressure at the manifold rupture disk to rupture it and allow flow of gas through the manifold before the gas in the pressure vessel is significantly heated and pressurized by the gas flow from the initiator housing.

11. In Rink et al., the manifold rupture disk is covered by a throttle portion 30, 230 or 330 that prevents a pressure wave from impinging on the manifold rupture disk. Accordingly, the formation of a localized high pressure on the rupture disk of Rink et al. is precluded by the throttle portion covering the manifold rupture disk.

12. Because of its construction, the acetylene-based airbag inflator of Rink et al. cannot function in the same manner as the gas generator of the present invention wherein the manifold rupture disk is directly exposed to the interior of the pressure vessel in the path of the pressure wave so that the pressure wave can travel through the pressure vessel to impinge on the manifold rupture disk and create a localized pressure at the manifold rupture disk to rupture it before gas in the pressure vessel is significantly heated and pressurized.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the likes so made are

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punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

By: James Michael Rose  
James Michael Rose

Dated: 4/13/2006